

MYODOCOPINE OSTRACODA OF THE ALASKAN CONTINENTAL SHELF

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Abstract.—Myodocopina in the voucher collection of the California Academy of Sciences obtained by the NOAA-BLM Alaskan Outer Continental Shelf Environment Assessment Survey during 1976–1978 comprise four species: Beaufort Sea: *Philomedes brenda* (Baird, 1850); Bering Sea: *Bathyleberis beringensis*, n. sp.; Gulf of Alaska: *Scleroconcha diplax*, n. sp.; Chukchi Sea: *Bathyleberis* species A. The last three species are described and illustrated. A supplementary description is presented of the holotype of *Bathyleberis thrix* Kornicker, 1988, from the Beaufort Sea.

This study was initiated by a request from Barbara Hudler, Senior Curatorial Assistant, NOAA/BLM Project, Ichthyology Department, California Academy of Sciences, to assist in further identification of Ostracoda in a voucher collection of specimens from the NOAA-BLM Alaskan Outer Continental Shelf Environment Assessment Survey during 1976–1978. Of the 17 samples examined only five contained Myodocopina: two samples from the Beaufort Sea contained *Philomedes brenda* (Baird, 1850); one sample from the Bering Sea contained *Bathyleberis beringensis*, n. sp.; a sample from the Gulf of Alaska contained *Scleroconcha diplax*, n. sp., and a sample from the Chukchi Sea contained a juvenile left in open nomenclature as *Bathyleberis* species A.

Cylindroleberididae

The Cylindroleberididae comprise three subfamilies: Cylindroleberidinae, Cyclasteropinae, and Asteropteroinae. Only the first subfamily is present in the collection. One species of Cyclasteropinae (*C. sharpei* Kornicker, 1981) may occur off the Alaskan coast (Kornicker 1981:2, 99); no members of the Asteropteroinae have been reported in the vicinity of Alaska.

Cylindroleberidinae

One genus, *Bathyleberis* Kornicker, 1975, is represented in the collection. That genus as well as the genus *Empoulsenia* Kornicker, 1975, have previously been reported from Arctic seas (Chavtur 1978, 1983; Kornicker 1988).

Bathyleberis Kornicker, 1975

Type species.—*Bathyleberis grossmani* Kornicker, 1975.

Composition.—Five species have been reported from northern seas and three from southern oceans (Kornicker 1988). The new species, *B. beringensis*, from the Bering Sea brings to nine the number of species referred to the genus. The specimen from the Chukchi Sea designated *Bathyleberis* species A may be an additional new species. A supplementary description of the holotype of *B. thrix* Kornicker, 1988, from the Beaufort Sea is presented here.

Bathyleberis beringensis, new species Figs. 1, 2

Etymology.—Named for type locality.

Material.—Ovigerous female (holotype), California Academy of Sciences #023999,

on slide and in alcohol; collected 12 May 1976, by personnel of the University of Alaska (Dr. Howard Feder, Principal Investigator).

Distribution. — Bering Sea, Alaska, 56°31'12"N, 167°55'54"W, 119 m (type locality).

Description of adult female (Figs. 1, 2). — Carapace elongate with subparallel dorsal and ventral margins (Fig. 1a); posterior evenly rounded in lateral view; incisur well developed and at about valve midheight.

Infold (Fig. 1b, c): Rostral infold dorsal to list with about 40 long bristles (10 along list, remainder forming 2 irregular rows parallel to anterodorsal shell margin); and additional short bristles (not all bristles shown on illustration) (Fig. 1b); about 10 bristles forming irregular row between list and dorsal edge of incisur. Anteroventral infold with 5 small bristles near inner end of incisur, about 17 long bristles and 12 minute bristles ventral to list, and about 10 minute bristles dorsal to list. Narrow list (with anterior end just ventral to incisur) paralleling and close to inner margin of anteroventral and ventral infold, then broadening along posteroventral and posterior infold. Ventral infold ventral to narrow list with about 25 fairly long bristles forming row about midway between list and valve edge (posterior 7 bristles more closely spaced). Infold between valve edge and broad posteroventral and posterior list with 45–48 bristles forming row near valve edge (22–25 long bristles in anterior part of row followed by about 23 small bristles; 1–4 minute pustules between several pairs of the small bristles), and 4 fairly stout processes about midway between list and valve edge (Fig. 1c). Broad posteroventral and posterior list with 15 flap-like bristles (about 8 tubules observed at base of some flap-like bristles) and 165 bristles along proximal edge of list; many bristles along ventral half of list longer than those along dorsal half (Fig. 1c; all bristles not shown on illustration).

Vestment (Fig. 1b): Numerous slender

spines present posterior to inner margin of anterodorsal infold.

Size: Length 2.13 mm, height 1.09 mm.

First antenna (Fig. 1d): 1st joint with medial and lateral spines forming short rows. 2nd joint spinous, with 2 spinous bristles (1 lateral, 1 dorsal). 3rd joint separated from 4th joint by fairly distinct lateral and medial sutures, combined 3rd and 4th joints forming square; 3rd joint with 7 bristles (1 small ventral, 6 spinous, dorsal, and arranged as 2 single and 2 paired sets). 4th joint with slightly concave distal margin, with 3 bristles (2 ventral, 1 dorsal). Sensory bristle of 5th joint with 1 short proximal filament and 6 long terminal filaments. Medial bristle of 6th joint long, with base near ventral edge of joint. 7th joint: a-bristle claw-like, shorter than bristle of 6th joint; b-bristle with 4 marginal filaments (1 short proximal, 3 longer distal); c-bristle reaching slightly past tip of sensory bristle of 5th joint, with 6 short marginal filaments. 8th joint: d-bristle longer than a-bristle, bristle-like with pointed tip; e-bristle filament-like, distal part broken off on both limbs of holotype; f-bristle bent dorsally, with 5 or 6 marginal filaments; g-bristle about same length as c-bristle, with 5 or 6 marginal filaments (distal filament minute).

Second antenna: Protopodite with hairs along distal dorsal margin and on anterodorsal part of medial surface, none along ventral margin, and with small distal medial bristle (Fig. 1e). Endopodite with 3 well defined joints (Fig. 1f); terminal filament about $\frac{1}{3}$ longer than stem. Exopodite: bristle of 2nd joint reaching 9th joint, with slender ventral spines; bristles of joints 3 and 4 with slender ventral spines proximal to midlength, and natatory hairs; bristles of joints 5–8 with few indistinct slender ventral spines proximal to midlength, and natatory hairs; 9th joint with 3 bristles (2 long with natatory hairs, 1 small with few minute spines); 1st joint with long distal hairs on concave margin; joints 2–8 with minute indistinct spines

forming distal row; basal spines absent; 9th joint with small lateral spine about $\frac{1}{2}$ length of joint.

Mandible (Fig. 2a, b): Coxale with medial spines. Coxale endite (Fig. 2a): ventral branch with spines forming 4–5 oblique rows and elongate club-like tip (aberrant?); small bristle near base of branch; ventral margin of dorsal branch with single pair of teeth followed by 7 single rounded teeth and short main spine; tip of branch protracted to fine point; dorsal bristle extending well past tip of branch and with slender spines at base. Basale (Fig. 2b): endite with 4 end bristles, 2 triaenid bristles with 11 pairs of spines proximal to terminal pair, 2 dwarf bristles and glandular peg; U-shaped depression present near ventral margin of basale at about midlength; proximal and dorsal margin of basale with dense spines; dorsal margin distal to midbristle with spines forming 2 rows extending onto lateral surface; dorsal margin with backward oriented spinous midbristle and 2 spinous terminal bristles (proximal less than half length of other). Exopodite tapering distally, about $\frac{3}{4}$ length of dorsal margin of 1st endopodial joint, hirsute, with 2 short terminal hirsute bristles (Fig. 2b). Endopodite (Fig. 2b): 1st joint: ventral margin with 3 stout bristles (medial with short spines, others with long spines except near tip). 2nd joint: dorsal margin with 2 proximal bristles and stout a-, b-, c-, and d-bristles; lateral side near dorsal margin with long bristle between b- and c-bristles and c- and d-bristles; medial side with short spines forming rows, 2 cleaning bristles between a- and b-bristles, 4 cleaning bristles forming oblique row between b- and c-bristles, 6 cleaning bristles forming oblique row between c- and d-bristles, and 1 long spinous bristle just distal to base of d-bristle; ventral margin with 3 long spinous terminal bristles. End joint with straight bare dorsal claw and 5 spinous bristles (4 long stout, 1 short slender). (All marginal spines on bristles not shown on illustrated limb.)

Maxilla (Fig. 1g): Epipodial appendage reaching to about midlength of dorsal margin of basale, hirsute distally, with pointed tip. Endite I with 4 bristles (3 long stout spinous and 1 short slender); endite II with 3 long spinous bristles. Basale: medial surface spinous (not all spines shown on illustration), with 3 bristles near dorsal margin (proximal shorter than others); lateral surface near midheight with short proximal bristle; ventral margin with 1 proximal, backward oriented bristle, 1 minute, indistinct distal bristle, and 1 long spinous terminal bristle. Endopodite: 1st joint with short alpha-bristle and long spinous beta-bristle; end joint with spinous terminal bristle longer than beta-bristle.

Fifth limb (Fig. 2c): Lateral side of comb with stout spinous exopodial bristle, 1 slender bristle just ventral to base of exopodial bristle, 2 pairs of bristles closer to ventral margin, and 4 additional bristles almost on ventral margin (1 proximal, 1 medial near proximal paired bristles, and 2 distal); ventral margin with long and short bristles forming single row (not all shown on illustration; distal 4–5 bristles longer than others).

Sixth limb (Fig. 2d, e): Small medial proximal bristle set farther back from anterior margin than usual (Fig. 2d); anterior margin with upper and lower bristles on well defined endite sutures; anteroventral corner of skirt with 3 small hirsute bristles; lateral flap with 2 slender recurved hirsute bristles (Fig. 3d); anterior tip with 5 anterior bristles curving in same direction when viewed ventrally with limb not compressed under cover slip (Fig. 2e); posteroventral margin of skirt with 14–16 spinous bristles (those at posterior corner longer) (Fig. 2d).

Seventh limb (Fig. 2f): 6–7 bristles in proximal group, 3 or 4 on each side (one bristle on each side longer and with 4 bells, others with 2–3 bells); 2 short bristles on subterminal segment, 1 on each side, each with 3 bells); 4 bristles on terminal segment,

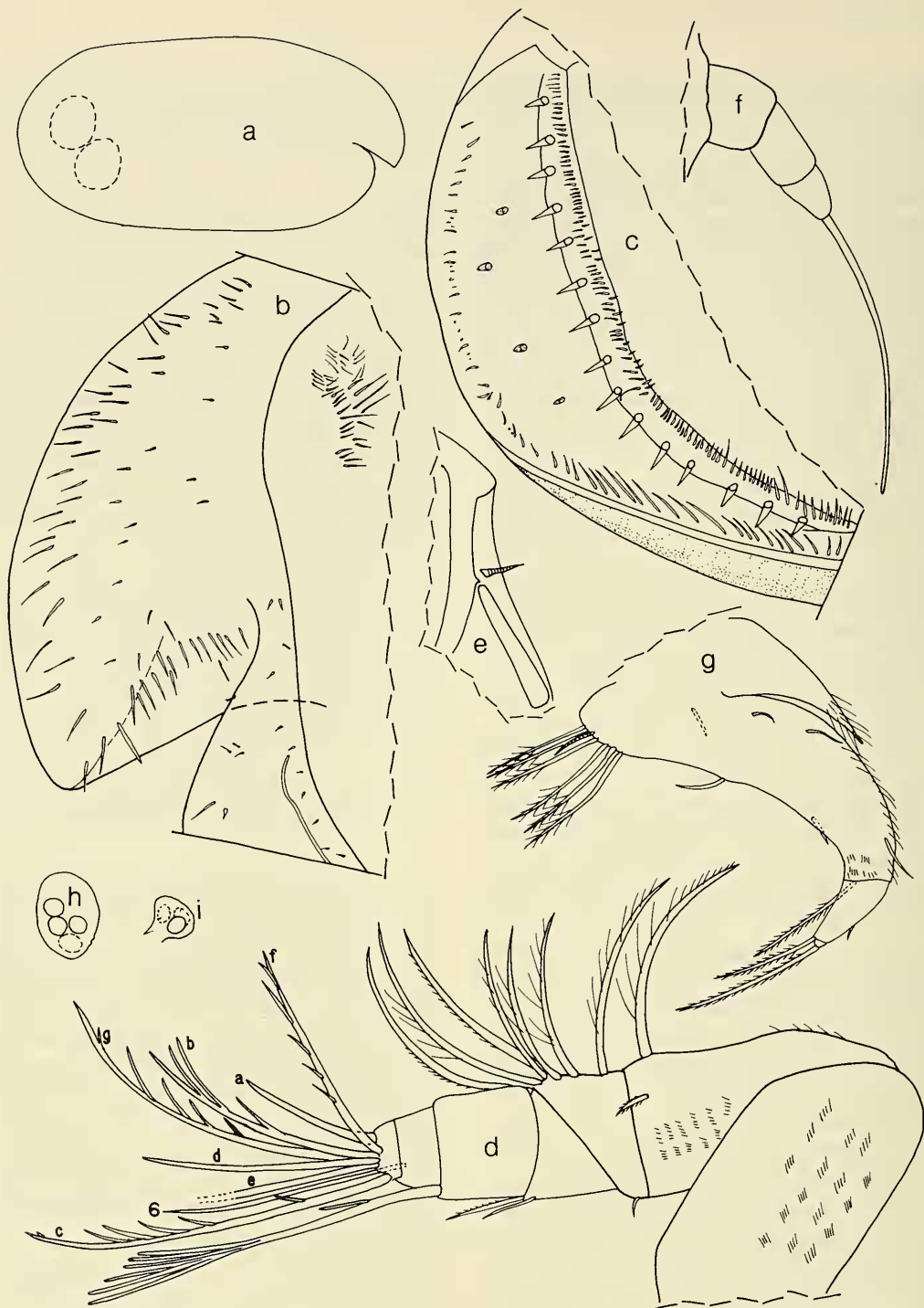


Fig. 1. *Bathyleberis beringensis*, adult female, holotype: a, Complete specimen from right side showing position of 2 eggs, length 2.13 mm; b, Inside view of anterior of right valve; c, Inside view of posterior of left valve; d, Lateral view of left 1st antenna; e, Medial view of anterodorsal part of protopodite of left 2nd antenna; f, Medial view of endopodite of left 2nd antenna; g, Medial view of left maxilla; h, i, Right and left lateral eyes, respectively.

2 on each side (distal with 2 bells, proximal with 4–5). Terminus with opposing combs, each with 12–13 spinous teeth (spines not shown on illustrated limb).

Furca (Fig. 2g): Each lamella with 9 claws; claws 1–8 claw-like, with posterior marginal spines; claw 9 bristle-like, bare; claws 1–6 with hairs along anterior margin; claws of right lamella anterior to like-numbered claws of left lamella; edge of lamellae following claws with minute spines.

Bellonci organ (Fig. 2h): Elongate, slightly broader at midlength and with rounded tip.

Eyes: Medial eye unpigmented, bare (Fig. 2h); lateral eye indistinct with 3–4 ommatidia (Fig. 1h, i).

Upper lip (Fig. 2i): With hirsute lobe on each side of saddle; each lobe with 2 minute anterior spines, saddle with minute anterior spine. Lower lip with lateral hirsute flap on each side of mouth.

Posterior of body (Fig. 2j): Hirsute and with small thumb-like spinous process.

Y-sclerite (Fig. 2k): Typical for subfamily.

Comparisons.—The only species of the genus reported previously from the Bering Sea is *B. kurilensis* (Chavtur, 1978). The species was described by Chavtur (1978:154) from the Kuril Islands. In a later publication (Chavtur 1983:81) the range of the species was expanded to the Northwest Pacific from Hokkaido Island to the Chukchi Sea, including the far eastern seas of Russia and in the northeast area at Unimak Island (Aleutian Is.), and Vancouver Island. The length of the carapace of the female *kurilensis* is 2.9–3.6 mm (longest in the Bering and Chukchi seas). The length of the female *beringensis* from the Bering Sea is 2.13 mm, considerably smaller than that of *kurilensis*. The carapace of *beringensis* also differs from that of *kurilensis* in other characters: the posterior infold of *beringensis* bears 15 flap-like bristles on the list and four processes between the list and the posterior edge of the valve; whereas, on *kurilensis* the list bears at least 35 flap-like bristles and has

no processes between the list and posterior edge of valve (based on Chavtur 1978:fig. 4); also, in lateral view the dorsal and ventral margins of the carapace of *kurilensis* are more convex than those of *beringensis* (compare Chavtur 1978:fig. 4, and Fig. 1a, herein). The appendages of *beringensis* and *kurilensis* are quite similar, with perhaps a difference in the number of posteroventral bristles on the skirt of the 6th limb (14–16 for *beringensis*, 21 for *kurilensis*), and the beta-bristle of the maxilla is shorter than the terminal bristle of the end joint on *beringensis* and the reverse on *kurilensis*. *B. beringensis* has small lateral eyes, whereas *kurilensis* has none. *Bathyleberis beringensis* differs from *B. thrix* from the Beaufort Sea in having a short proximal filament on the sensory bristle of the 5th joint of the 1st antenna, and in having 12–13 bristles compared to 29–31 bristles on the 7th limb. *Bathyleberis beringensis* is closely related to *B. hancocki* Baker, 1979, reported from off Southern California and Oregon. The shell of that species differs from that of *beringensis* in having no processes between the posterior infold and posterior edge of the shell. *Bathyleberis hancocki* is without lateral eyes and has 11 rather than 6–7 proximal bristles on the 7th limb. Also, the medial eye of *hancocki* is hirsute, whereas that of *beringensis* is bare. The tip of the ventral branch of the coxale endite of the left mandible of *beringensis* differs from that of other members of the genus on which it is known in being club-like and without terminal teeth; however, the endite on the right limb of the single specimen in the collection was not observed, and that of the left limb could be aberrant.

Bathyleberis thrix Kornicker, 1988
Fig. 3a

Material.—Holotype (USNM 193381), female (adult or late instar).

Distribution.—Beaufort Sea.

Supplementary description of holotype.—

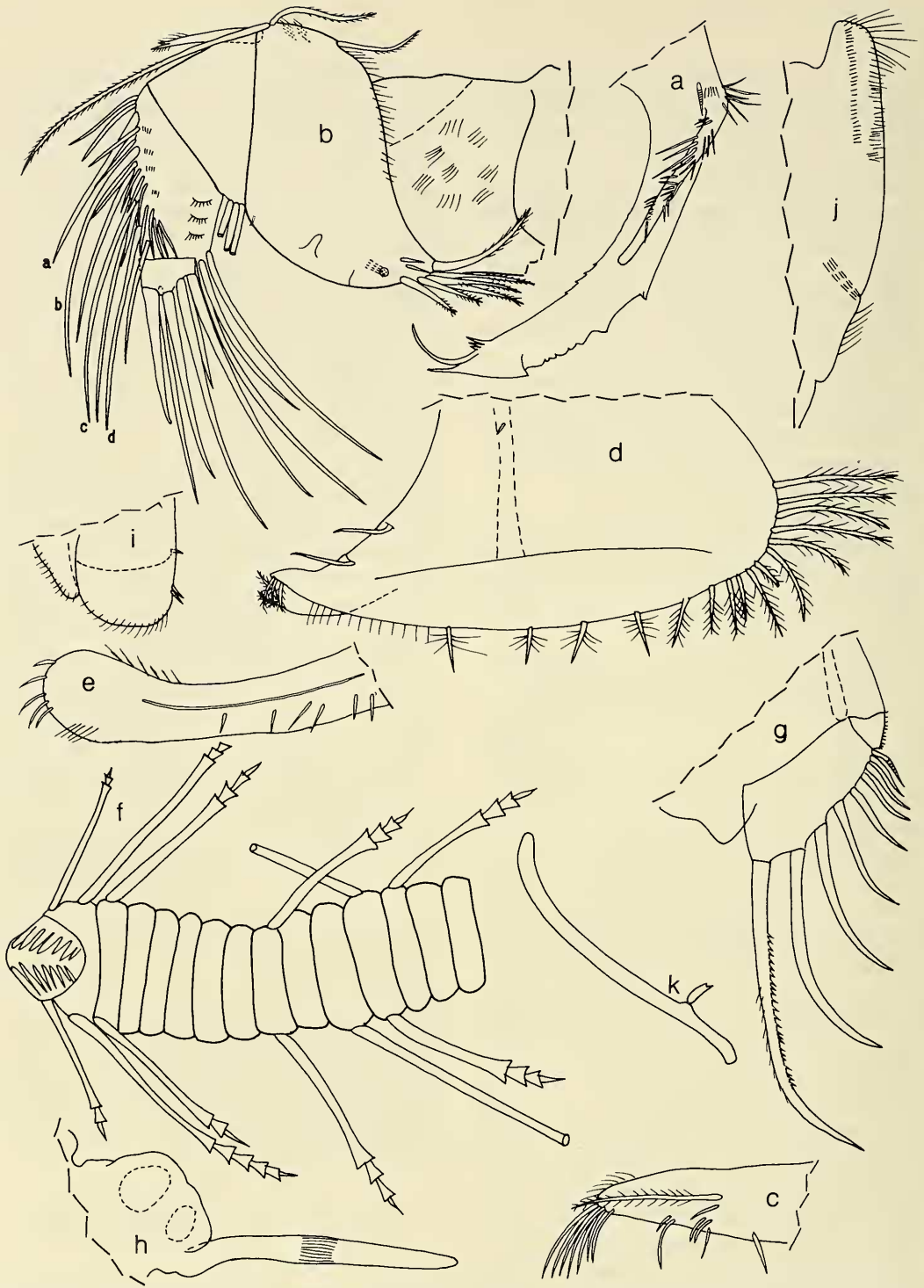


Fig. 2. *Bathyleberis beringensis*, adult female, holotype: a, Medial view of coxale endite of left mandible; b, Medial view of right mandible; c, Lateral view of comb of left 5th limb; d, Medial view of right 6th limb; e, Ventral view of anterior tip of left 6th limb (limb not under cover slip); f, 7th limb; g, Left lamella of furca; h, Medial eye and Bellonci organ; i, upper lip, anterior to right; j, Posterior of body; k, Y-sclerite, anterior to left.

In the description of the protopodite of the 2nd antenna (Kornicker 1988), the small medial bristle was not mentioned, and therefore, is illustrated herein (Fig. 3a).

Bathyleberis sp. A

Figs. 3b–l, 4

Material. — 1 A-1 male, California Academy of Sciences #023476, on slide and in alcohol, collected 17 Aug 1976 in ring net of 308 μ m mesh, USCGC *Glacier*.

Distribution. — Chukchi Sea, W of Pt. Barrow, Alaska, 71°31'30"N, 159°09'00"W, 0–160 m.

Description of A-1 male (Figs. 3b–l, 4). — Carapace elongate with convex dorsal and ventral margins in lateral view (Fig. 3b); posterior with posterodorsal corner angular and posteroventral corner evenly rounded; incisur well developed and just ventral to valve midheight.

Infold (Fig. 3c, d): Rostral infold dorsal to list with about 90 long bristles (about 12 along list, remainder forming 2 irregular rows along anterodorsal margin), and additional shorter bristles (not all shown on illustration) (Fig. 3c); about 10 bristles forming row between list and dorsal edge of incisur. Anteroventral infold with several small bristles near inner end of incisur, about 45 long bristles and 7 or more minute bristles ventral to list, and no bristles dorsal to list. Narrow list (with anterior end just ventral to incisur) paralleling and close to inner margin of anteroventral and ventral infold, then broadening along posteroventral and posterior infold. Ventral infold ventral to narrow list with about 40 bristles forming row about midway between list and valve edge. Infold between valve edge and broad posteroventral and posterior list with about 60 bristles forming row near valve edge and about 7–8 small processes about midway between list and valve edge (only ventral 6 of processes shown in Fig. 3d). Broad posteroventral and posterior list with 38 flap-like bristles (5–10 tubulès at base of flap-

like bristles) and 85 mostly small bristles forming row along proximal edge of list (generally 1–3 bristles just anterior to space between flap-like bristles; all bristles not shown in Fig. 3d).

Vestment (Fig. 3c): Numerous spines arranged in clusters posterior to inner margin of anterodorsal infold.

Central adductor muscle attachments (Fig. 3e): Comprising many individual scars.

Size: Length 2.90 mm, height 1.69 mm.

First antenna (Fig. 3h, i): 1st joint with medial and lateral spines forming rows. 2nd joint spinous, with 2 bristles (1 lateral, 1 dorsal). 3rd joint separated from 4th joint by well defined medial suture and ill defined lateral suture except near dorsal margin; combined 3rd and 4th joints forming square; 3rd joint with 7 bristles (1 small ventral, 6 spinous, dorsal, arranged as 2 single and 2 paired sets (proximal 3 bristles with long spines, distal 3 bristles with short marginal spines); 4th joint with concave distal margin well defined on medial side only, and 3 bristles (2 ventral, 1 dorsal). Sensory bristle of 6th joint with 1 short proximal filament and 6 long terminal filaments. Medial bristle of 6th joint long, spinous, with base near ventral edge of joint. 7th joint: a-bristle claw-like, shorter than bristle of 6th joint (Fig. 3h), a-bristle aberrant on left limb of holotype (Fig. 3i); b-bristle with 4 marginal filaments (1 short proximal, 3 long distal); c-bristle reaching slightly past tip of sensory bristle of 5th joint, with about 18 filaments (proximal 5–6 filaments minute; 3rd from last filament fairly long). 8th joint: d-bristle about same length as a-bristle, bristle-like with pointed tip; e-bristle longer than d-bristle, filament-like with blunt tip; f-bristle bent dorsally with about 20 filaments (bristles of proximal half very small); g-bristle about same length as c-bristle, with 7 marginal filaments.

Second antenna: Protopodite with hairs along distal dorsal margin and on antero-dorsal part of medial surface, and along posteroventral corner, and with small distal

medial bristle (Fig. 3f). Endopodite with 3 well defined joints (Fig. 3g): 1st joint short bare; 2nd joint elongate, with 2 slender distal spines or bristles; 3rd joint shorter than 2nd, with proximal filament almost reaching pointed tip of joint. Exopodite: bristle of 2nd joint reaching just past 9th joint, with long slender ventral and dorsal spines; bristles of joints 3–5 with long slender proximal spines and distal natatory hairs; bristles of joints 6–8 with natatory hairs; 9th joint with 4 bristles (2 long, with natatory hairs, 1 medium with natatory hairs, 1 small, dorsal, with small marginal spines); joints 4–8 with minute basal spines; 9th joint with minute lateral spine, length of spine not more than $\frac{1}{4}$ length of joint; joint 1 with long spines along concave margin; joints 2–8 with indistinct minute spines along distal margin.

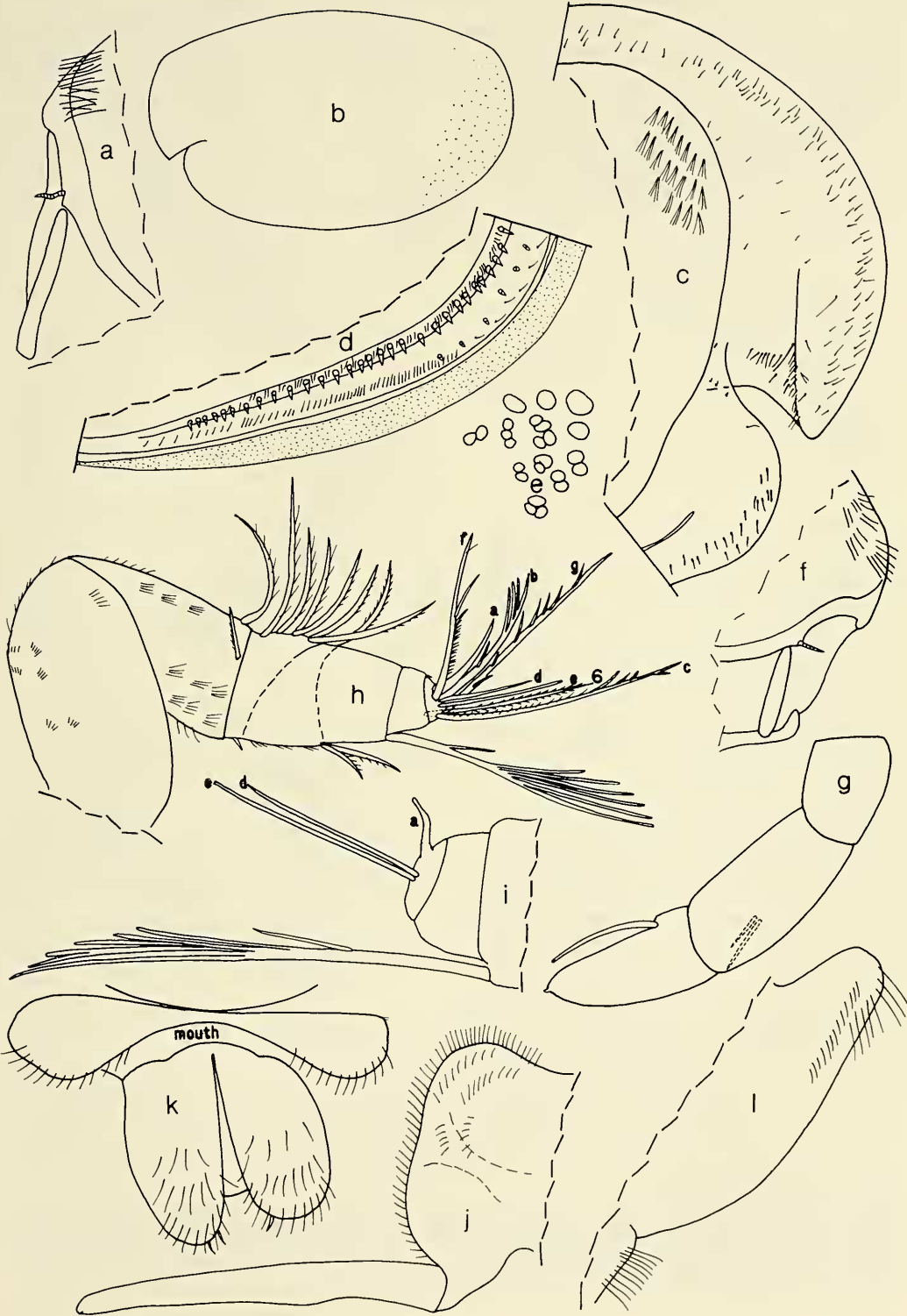
Mandible (Fig. 4a, b): Coxale with medial spines. Coxale endite (Fig. 4a): ventral branch with spines forming 5–6 oblique rows and tip with 2 small teeth (ventral tooth with tip curving dorsally); small bristle near base of branch; ventral margin of dorsal branch with 3–4 nodular teeth followed by several smaller nodes and small main spine; tip of branch with 2 small spines; dorsal bristle extending well past tip of branch and with indistinct marginal hairs. Basale (Fig. 4b): endite with 4 end bristles, 3 triaenid bristles with 7–13 pairs of spines proximal to terminal pair, 2 dwarf bristles and glandular peg; U-shaped depression present near ventral margin of basale at about midlength; proximal and dorsal margin of basale with dense spines; dorsal margin distal to midbristle with spines forming rows extending onto lateral surface; ventral margin distal to

U-shaped depression with spines forming rows extending onto lateral surface; dorsal margin with backward oriented spinous midbristle and 2 spinous terminal bristles (proximal less than half length of other). Exopodite tapering distally, about $\frac{2}{3}$ length of dorsal margin of 1st endopodial joint, hirsute with 2 short terminal bristles. Endopodite (Fig. 4b): 1st joint: ventral margin with 3 stout bristles (medial with short spines, others with long spines except near tip). 2nd joint: dorsal margin with 3 proximal bristles and stout a-, b-, c-, and d-bristles; lateral side near dorsal margin with long bristle between b- and c-bristles and c- and d-bristles; medial side with short spines forming rows, 1 cleaning bristle just proximal to base of a-bristle, 2 cleaning bristles between b- and c-bristles, 3 cleaning bristles forming oblique row near b-bristle, 4 cleaning bristles forming oblique row near base of c-bristle, 2 cleaning bristles near base of c-bristle, 7 cleaning bristles forming oblique row near c- and d-bristles, and 1 long spinous bristle just distal to base of d-bristle; ventral margin with 3 long spinous terminal bristles. End joint with straight dorsal claw and 5 spinous bristles (4 long stout, 1 short slender). (All marginal spines on bristles not shown on illustrated limb.)

Maxilla (Fig. 4c): Epipodite short, triangular, hirsute distally with pointed tip. Endite I with 4 bristles (3 long stout spinous and 1 short slender); endite II with 3 long spinous bristles. Basale: medial surface spinous (not all spines shown on illustration), with 3 bristles near dorsal margin (proximal shorter than others); lateral surface near midheight with short proximal bristle; ven-

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Fig. 3. *Bathyleberis thrux* Kornicker, holotype: a, Medial view of anterodorsal part of protopodite of right 2nd antenna. *Bathyleberis* species A, A-1 male: b, Complete specimen from left side, length 2.90 mm; c, Inside view of anterior of left valve, d, Inside view of posteroventral corner of right valve; e, Lateral view of central adductor muscle ends where attached to left valve, anterior to left; f, Medial view of anterodorsal part of protopodite of left 2nd antenna; g, Medial view of endopodite of left 2nd antenna; h, Lateral view of right 1st antenna; i, Lateral view of tip of right 1st antenna (not all bristles shown); j, Medial eye and Bellonci organ; k, Ventral view of upper and lower lips and mouth area, anterior to bottom; l, Posterior of body.



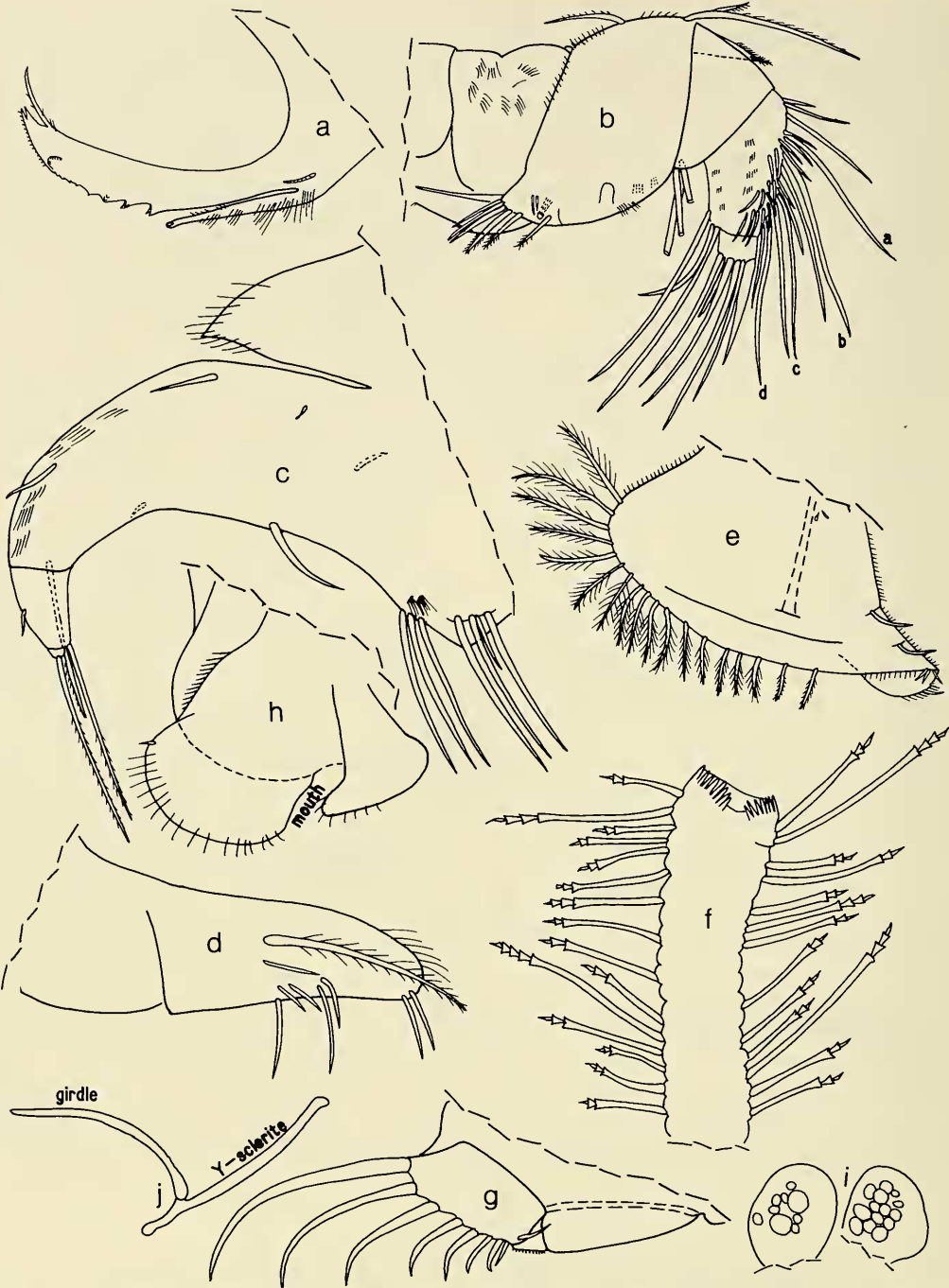


Fig. 4. *Bathyleberis* species A, A-1 male: a, medial view of coxale endite of left mandible; b, Medial view of left mandible; c, medial view of right maxilla; d, Lateral view of comb of right 5th limb; e, Medial view of left 6th limb; f, 7th limb; g, Left lamella of furca; h, Upper and lower lips and mouth area, anterior to left; i, Right and left lateral eyes; j, Y-sclerite and girdle, anterior to right.

tral margin with 1 proximal, backward oriented bristle, 1 minute distal bristle, and 1 long spinous terminal bristle. Endopodite: 1st joint with short alpha-bristle and long spinous beta-bristle; end joint with spinous terminal bristle slightly longer than beta-bristle.

Fifth limb (Fig. 4d): Lateral side of comb with stout spinous exopodial bristle, 1 slender bristle just ventral to base of exopodial bristle, 2 pairs of bristles closer to ventral margin, and 3 additional bristles almost on ventral margin (1 near proximal paired bristles and 2 distal).

Sixth limb (Fig. 4e): 2 small medial proximal bristles set back from ventral margin on both limbs; anterior margin with upper and lower bristles on well defined endite sutures; anteroventral corner of skirt with 3 small bristles; lateral flap with slender recurved bristle; posteroventral margin of skirt with 18–19 spinous bristles (those at posterior corner longer).

Seventh limb (Fig. 4f): Bristles fairly evenly distributed, not divided into proximal and distal groupings; left limb with 28 bristles (13 on one side, 15 on other; right limb missing from specimen); most bristles short with 2 bells, but 4 longer with 3–4 bells; bristles present on most distal 16 segments (including terminal segment bearing comb teeth), some segments with 2 bristles (1 on each side); terminal segment with 4 bristles (2 on each side). Terminus with opposing combs, each with 15 spinous teeth (spines not shown on teeth of illustrated limb).

Furca (Fig. 4g): Each lamella with 9 claws and bristles; claws 1–7 recurved claw-like; claw 8 straight bristle-like; claw 9 bristle-like oriented dorsally; claws 1–7 with teeth along posterior margins and slender hairs along anterior margins; claws of right lamella slightly anterior to like claws of left lamella; edge of lamellae following claws with minute spines.

Bellonci organ (Fig. 3j): Elongate, broad-

ening slightly at midlength, and with rounded tip.

Eyes: Medial eye extremely hirsute but unpigmented (Fig. 3j). Lateral eyes small, unpigmented, each with many poorly defined and indistinct ommatidia (Fig. 4i).

Lip (Figs. 3k, 4h): With hirsute lobe on each side of saddle, each lobe with 1–2 slender anterior spines. Lower lip with hirsute flap on each side of mouth.

Posterior of body (Fig. 31): Hirsute, with short spinous thumb-like dorsal process.

Genitalia: Small lobe anterior to furca on each side of body (not identified with certainty as copulatory organs).

Y-sclerite (Fig. 4j): Typical for subfamily.

Gills: 7 well-developed gills with broadly rounded tips on each side of posterior of body.

Comparisons. — The carapace length of *B. sp. A* is similar to that of *B. kurilensis*, but species *A* has more bristles on the 7th limb (28 compared to 13–26) and the angle between the toothed combs of the 7th limb is acute on *B. kurilensis* and obtuse on *B. sp. A*. The 7th limb of *B. sp. A* strongly resembles that of *B. thrix*, which was described from three specimens from the Beaufort Sea (Kornicker 1988). The length of the carapace of the A-1 male of *B. sp. A* is 2.90 mm, whereas the length of the largest known specimen of *B. thrix* (a female adult or late instar) is only 2.14 mm, but the difference could be negated if the largest specimen of *B. thrix* should prove to be one or more stages younger than *B. sp. A*, or if the size difference is sex-related; however, I think this unlikely. The sensory bristle of the 1st antenna of *B. thrix* does not have the short proximal filament that is on the sensory bristle of *B. sp. A*, but it has been shown previously that the sensory bristle of the A-1 male of some species in the *Cylindroleberidinae* have a proximal bristle that is absent on females (Bowman & Kornicker 1967:16); whether this relationship holds for *B. thrix* is unknown. An unusual character of the 6th

limbs of *B. sp. A* is the presence of two proximal medial bristles. Other species have only one bristle, but because only a single specimen of *B. sp. A* is on hand the variability of this character could not be ascertained. It is quite possible that the specimen referred to *B. sp. A* is a juvenile of *B. thrix*, but I find it expedient to keep them separate until the ontogeny of *thrix* or *B. sp. A* is known better.

Philomedidae

The Philomedidae comprise two subfamilies, Philomedinae and Pseudophilomedinae. Only the former is represented in the study area.

Philomedinae

This subfamily is represented on the Alaskan continental shelf by two genera, *Philomedes* Liljeborg, 1853, and *Scleroconcha* Skogsberg, 1920.

Philomedes Liljeborg, 1853

Type species.—*Philomedes longicornis* Liljeborg, 1853:176 [= *Cypridina Brenda* Baird, 1850].

Composition.—This genus has numerous species. *Philomedes brenda* has been reported previously from the Beaufort Sea (MacGinitie 1955:147; Kornicker 1988). A juvenile collected from the vicinity of Kodiak Island (Aleutian Islands) and referred to a new species *P. kadjakensis* by Chavtur (1983:56) was referred by Kornicker (1988) to *Philomedes* species indeterminate.

Philomedes brenda (Baird, 1850)

Philomedes brenda (Baird, 1850).—See Kornicker (1982:3; 1988) for comprehensive synonymy.

Lectotype.—British Museum (Natural History), B.M. 1945.9.26 91, dried and broken carapace, by subsequent designation (Sylvester-Bradley 1950:777).

Material.—Beaufort Sea: 1 juvenile, sta 23, haul 2, cross reference number K28, 30 Aug 1976, California Academy of Sciences #011460, 71°22'N, 152°20'W, 20–0 m, collected in ring net of 308 μ m mesh; 1 juvenile, sta 10, haul 1, 10 Aug 1977, California Academy of Sciences #011461, 71°35'N, 153°29'W, 41–0 m, collected in bongo net of 505 μ m mesh.

Distribution.—Widespread in the Arctic Ocean and in the North Atlantic (to 54°N in east Atlantic, and 44°N in west Atlantic). Generally collected at shelf and upper slope depths.

Discussion.—Both specimens in the collection are juveniles incapable of swimming. Therefore, although the samples were collected with plankton nets, the specimens were probably collected at the bottom. Kornicker (1988) reported the minimum depth at which the species was collected in the Beaufort Sea to be 27 m. The minimum depth for the species in the vicinity of Alaska is here reduced to 20 m.

Scleroconcha Skogsberg, 1920

Type species.—*Philomedes* (*Scleroconcha*) *appelloefi* Skogsberg, 1920.

Composition.—This genus has 15 species including a new species described here. Only one species has been reported previously from the continental shelf of Alaska, *S. ruffi* Kornicker, 1988. Another species has been reported from the Vancouver Island area of Canada, *S. trituberculatus* (Lucas, 1931). Six species have been reported from the northwestern Pacific: *S. ochotensis* Chavtur, 1978, *S. kubotai* Hiruta, 1981, *S. pavljuchkovi* Chavtur, 1983, *S. lucasae* Chavtur, 1983, *S. rectangularis* Chavtur, 1983, and *S. nanocristata* Chavtur, 1983. The remaining seven species have been reported from distant seas.

Scleroconcha diplax, new species Figs. 5–7

Etymology.—From the Greek *diplox* (=double) in reference to the two proximal

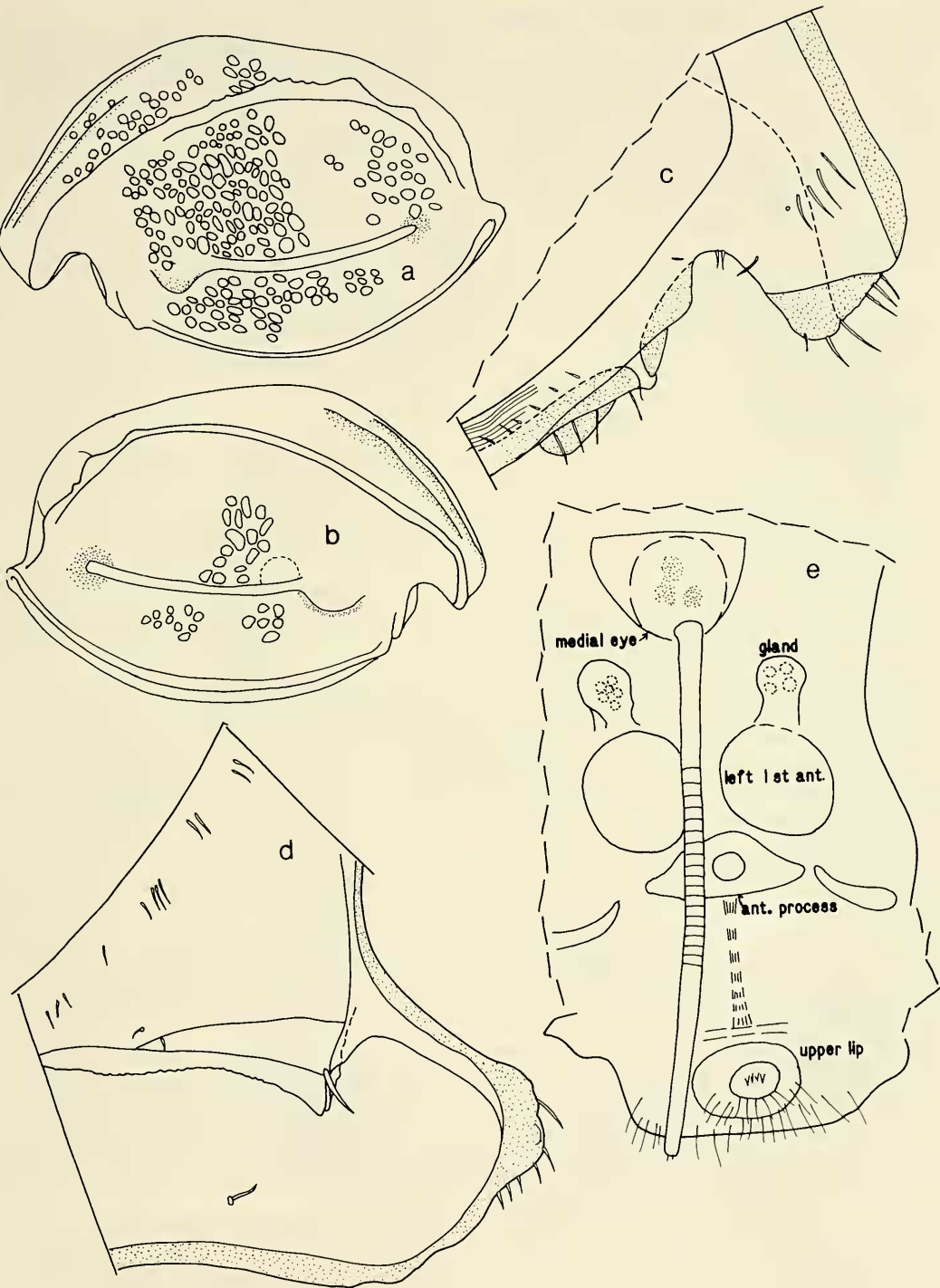


Fig. 5. *Scleroconcha diplax*, adult female, holotype: a, b, Left and right views of whole specimen, respectively, not all reticulations shown, length 2.79 mm; c, Inside view of anterior of left valve; d, Inside view of posterior of right valve; e, Anterior view of body.

anterior bristles on the 3rd and 4th endites of the 6th limb.

Material. — 1 ovigerous female (holotype), California Academy of Sciences # 010852, on slide and in alcohol, collected on 25 Aug 1978 by personnel of the University of Washington on the R/V *Yankee Clipper* (Dr. Mark Wangerin, Principal Investigator).

Distribution. — Gulf of Alaska, S coast of Kodiak Is., Kaiugnak, Alaska, 57°03'55"N, 153°40'05"W, 18 m (type locality).

Description of adult female (Figs. 5–7). — Carapace oval in lateral view, with prominent rostrum and small rounded caudal process (Fig. 5a–d).

Ornamentation (Fig. 5a, b): Lateral surface with subdued rib just within ventral margin terminating anteriorly in small anteroventral process, and terminating posteriorly on caudal process; very small process present on anteroventral margin of valve anterior to end of ventral rib. 2nd rib just ventral to central adductor muscle attachments with anterior end bending ventrally to form arc and terminating posteriorly in small bulge anterior to caudal process. 3rd rib dorsal to central adductor muscle attachments terminating anteriorly as process extending very slightly past anterior edge of rostrum, and terminating posteriorly on or near caudal process; 2 small processes present on rib near posterodorsal corner of valve. 4th rib just within anterodorsal margin of valve. 5th anterodorsal subdued rib between 3rd and 4th ribs terminating anteriorly on rostrum, and posteriorly not reaching valve midlength. Surface of valve with abundant, weakly developed, round fossae, appearing darker in transmitted light (Fig. 5a, b) (not all fossae shown in illustrations). Undivided bristles, some with broad bases, sparsely distributed over valve surface but not shown in illustrations.

Infold (Fig. 5c, d): Rostral infold with 6–7 bristles (1 bristle represented by socket on Fig. 5c); 2 bristles present on valve edge

close to selvage at inner end of incisor (could not be ascertained whether bristles medial or lateral to selvage) (Fig. 5c); 1 small bristle present ventral to inner edge of incisor; anteroventral infold with about 9 ridges and, also, 11–14 bristles forming row parallel to valve edge; infold along middle of ventral margin bare; posterior end of ventral infold in vicinity of caudal process with numerous slender bristles forming groups of 1–4 bristles; infold of caudal process with narrow flap with stout bristle at posterior tip and 2–3 smaller anterior bristles (Fig. 5d); 1 small bristle between flap and ventral valve edge.

Selvage: Broad lamellar prolongation with marginal fringe present along anterodorsal, anterior, and ventral margins of valve. Selvage divided at inner edge of incisor.

Size: Length 2.79 mm, height 1.93 mm.

First antenna (Figs. 5e, 6a, 7f): 1st joint with minute lateral spines forming rows near dorsal margin. 2nd joint spinous with 3 bristles (1 ventral, 1 dorsal, 1 lateral). Short 3rd joint with few spines and 3 bristles (1 ventral, 2 dorsal). 4th joint spinous, with 6 bristles (4 ventral, 2 dorsal). 5th joint with sensory bristle with about 7 small marginal filaments and tip with several filaments (filaments not shown in Fig. 6a). 6th joint minute, fused to 5th joint; medial bristle with long proximal and short distal spines. 7th joint: a-bristle similar to that of bristle of 6th joint; b-bristle broken on left limb (Fig. 6a) and obscure on right limb, with several short marginal filaments; c-bristle about same length as sensory bristle of 5th joint, with short marginal filaments. 8th joint: d- and e-bristles about same length as c-bristle, bare with blunt tips; f- and g-bristles about same length as c-bristle, with short marginal filaments.

Second antenna: Protopodite bare. Endopodite 2-jointed (Fig. 6b): 1st joint short, with 5 proximal bristles (1 slightly longer than others) and 1 distal bristle about same length as proximal bristles; 2nd joint with 1 very long spinous proximal bristle, and 1

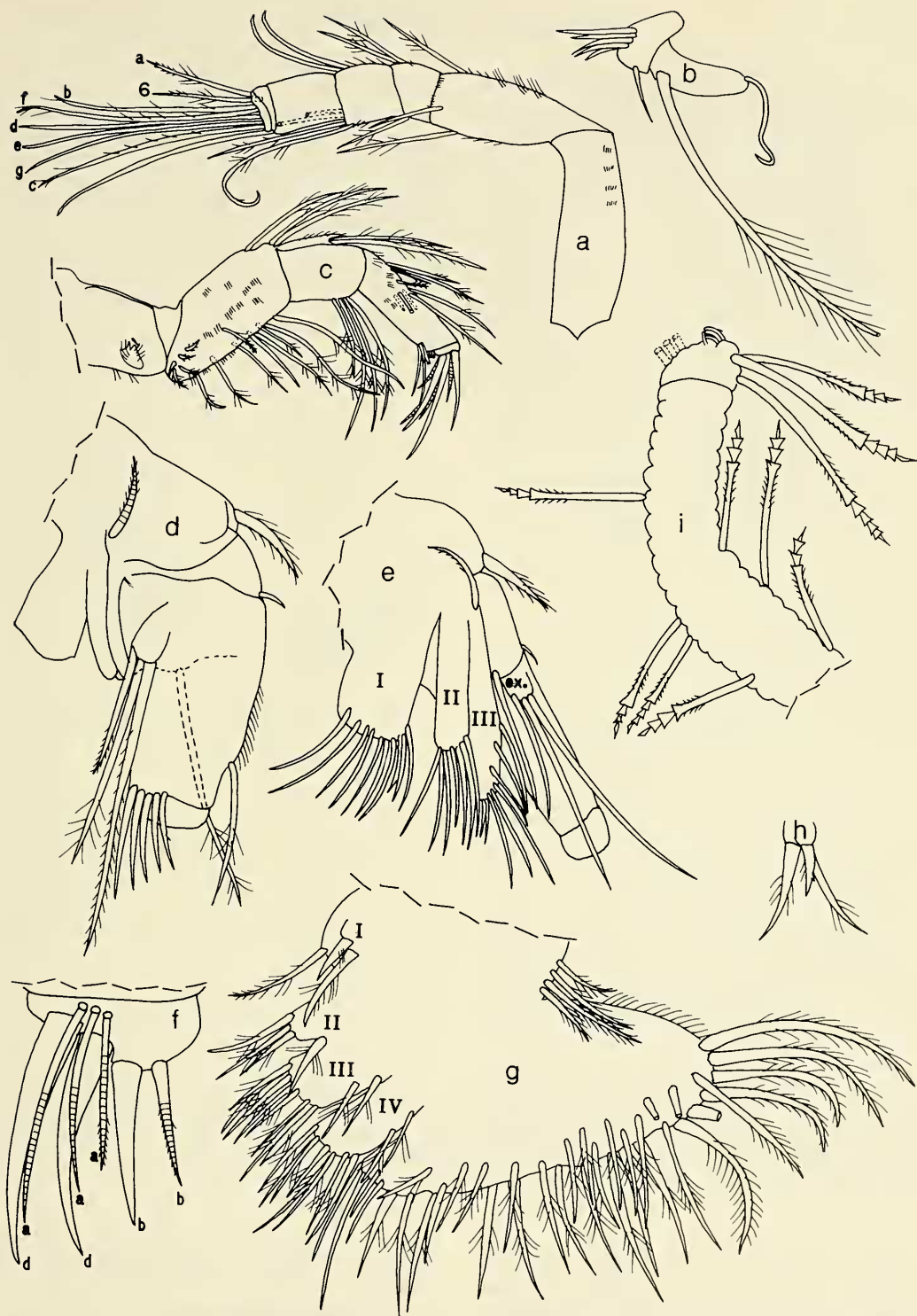


Fig. 6. *Scleroconcha diplx*, adult female, holotype: a, Lateral view of left 1st antenna; b, Medial view of endopodite of right 2nd antenna; c, Medial view of left mandible; d, e, Lateral views of right maxilla ("c" drawn while appendage not under cover slip); f, Lateral view of end joint of right maxilla (not all c- and d-bristles shown); g, Medial view of right 6th limb; h, Medial view of endite I of left 6th limb; i, 7th limb.



Fig. 7. *Scleroconcha diplx*, adult female, holotype: a, Posterior view of left 5th limb (not all spines on bristles shown); b, Detail of largest constituent tooth of 1st exopodial joint, from "a"; c, Anterior view of right 5th limb (drawn while not under cover slip); d, Mounted right 5th limb showing posterior view of 2nd exopodial joint and anterior view of 1st joint and endites; e, Right lamella of furca; f, Anterior of body showing medial eye and Bellonci organ, anterior process, upper lip, and 1st joint of right 1st antenna.

shorter terminal bristle. Exopodite: 1st joint with minute medial bristle on distal margin; bristles of joint 2-4 bare, fairly short but all reaching well past 9th joint; bristles of joints 5-8 broken; 9th joint with 7 bristles (3 long stout broken, 1 medium broken, 3 short,

slender); joints 2-8 with slender spines forming row along distal margin, and with minute basal spine or spines. Mandible (Fig. 6c): Coxale with spines along ventral margin; endite bifurcate, hirsute spinous, bifurcate tips pectinate; mi-

nute bristle dorsal to base of endite. Basale: dorsal margin with 3 spinous bristles (1 distal to midlength, 2 subterminal); medial surface hirsute, with 5 proximal bristles (3 pectinate unringed, 2 ringed with long proximal and short distal spines), and 1 bristle (with long proximal and short distal spines) at midlength; ventral margin with 8 spinous bristles (5 shorter bristles with bases on lateral surface). Exopodite about $\frac{3}{4}$ length of dorsal margin of 1st endopodial joint, hirsute with 2 minute spines at tip, and with 2 subterminal bristles bearing wreaths of long spines (distal outer bristle shorter). 1st endopodial joint with 4 ventral bristles bearing wreaths of long spines. 2nd endopodial joint: ventral margin with bristles forming 2 distal groups (3 bristles in each group); dorsal margin with 9 bristles near middle, some with bases on medial and lateral sides of joint; medial surface and proximal dorsal margin spinous. End joint with 3 bare claws (dorsal claw about $\frac{3}{4}$ length of ventral medial claw; ventral medial claw shorter than ventral lateral claw), and 4 bristles.

Maxilla (Fig. 6d–f): Coxale with hirsute dorsal bristle. Endite I with 10 spinous and pectinate bristles; endites II and III narrow, each with about 8 distal bristles; endite III also with proximal bristle (Fig. 6d, e). Basale with 3 bristles along distal margin (dorsal of these small; medial and ventral long). Exopodite with 3 spinous bristles. 1st endopodial joint spinous, with 1 spinous alpha-bristle and 5 beta-bristles (bare or with few spines) (Fig. 6d). End joint with 3 a-bristles (bare or with few spines) (Fig. 6f), 2 b-bristles (1 ringed and bearing small spines, 1 stout, unringed, claw-like, bare); 2 d-bristles stout, unringed, claw-like, bare; remaining c- and d-bristles slender, ringed, bristle-like, but not counted (these not shown in Fig. 6f).

Fifth limb (Fig. 7a–d): Epipodite with 54 hirsute bristles. Endite I with 5–6 spinous bristles; endite II with 7 spinous bristles; endite III with about 9 bristles (not all en-

dite bristles shown in Fig. 7a, c). 1st exopodial joint: anterior side with 2 spinous bristles at midwidth (Fig. 7c), and 1 short bristle on lobe near outer edge (Fig. 7c, d); main tooth with 4 constituent teeth, each with 3–5 small marginal teeth (Fig. 7a); distal constituent tooth with proximal tooth-like process (Fig. 7b); 1 spinous bristle proximal to 4 constituent teeth (Fig. 7a). 2nd exopodial joint: large tooth with 1 small pointed tooth along inner margin (arrow on Fig. 7a, d); distal outer corner of large tooth with minute posterior d-bristle (Fig. 7d); long proximal posterior c-bristle bare; outer bristle farthest from main tooth of 3 posterior a, b-bristles short, other outer bristle about $\frac{2}{3}$ length of middle bristle, all bare (Fig. 7a). 3rd endopodial joint (Fig. 7a): inner lobe with 3 bristles (2 shorter bristles bare or with few spines, longest bristle with long proximal and short distal spines); outer lobe with 2 bristles (short bristle with long proximal hairs and short distal spines; long bristle with wreaths of long spines). 4th and 5th joints fused, hirsute, with total of 6 spinous bristles (Fig. 7a).

Sixth limb (Fig. 6g, h): Endite I with 3 spinous bristles; endite II with 1 proximal and 3 terminal spinous bristles; endite III with 1 or 2 proximal and 8 terminal spinous bristles; endite IV with 2 proximal and 7–8 terminal bristles. End joint with 33–35 hirsute and spinous bristles. Four epipodial bristles with long proximal hairs.

Seventh limb (Fig. 6i): Terminus consisting of comb with 4 small teeth opposite single peg. Each limb with 13 bristles, 6 in terminal group (3 on each side) and 7 in proximal group (3–4 on each side); proximal bristles with 3–4 bells, terminal bristles with 3–6 bells; all bristles with distal marginal spines.

Furca (Fig. 7e): Each lamella with 15 claws with small teeth along posterior margins; hairs present along lamellae following claws; right lamella slightly anterior to left.

Bellonci organ (Figs. 5e, 7f): With about 12 well defined and 3 poorly defined sutures

(sutures not shown in Fig. 7f); proximal and distal $\frac{1}{3}$ without sutures; tip broadly rounded and with terminal spine.

Eyes: Medial eye with dark brown pigment, bare (Figs. 5e, 7f). Lateral eyes not observed.

Upper lip (Figs. 5e, 7f): Normal for genus, with about 4 small anterior processes.

Anterior of body (Figs. 5e, 7f): Single rounded process between upper lip and medial eye.

Posterior of body: A few minute spines in vicinity of posterodorsal corner.

Y-sclerite: Normal for genus.

Eggs: Holotype with 6 eggs in marsupium.

Comparisons.—The new species *S. diplax* differs from *S. ruffi* in having two proximal bristles along the anterior margin of the 4th endite of the 6th limb; the variability of this character for *diplex* is not known, but all other species of *Scleroconcha* on which the 6th limb has been described have only one proximal bristle on the endite. The two species also appear to differ slightly in the morphology of the lower lateral rib (rib just ventral to central adductor muscle attachments): on *ruffi* the anterior end of the rib forms a low mound, whereas, on *diplex* the anterior end bends ventrally to form an arc. In addition to *ruffi* and *diplex*, *S. rectangularis* and *S. pavluchkovi* have Bellonci organs with rounded tips, all other species on which the character is known have pointed tips. *Scleroconcha diplax* differs from *rectangularis* in having fewer bristles on the rostral infold (6–7 compared to 16–18), and in not having the lower lateral midrib bending ventrally to meet the ventral rib. The carapace of *diplex* differs from that of *pavluchkovi* in not having a process at the anterior end of the lower lateral midrib. *Scleroconcha trituberculatus* differs from *diplex* in having 16 claws instead of 15 on the furca, and in having a much shorter distal bristle on the 1st endopodial joint of the 2nd antenna.

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